interest in the subject as discussed both locally and in Parliament. Last week he visited St. Mary's Loch, and took pains to compare it with its very various reputation. He was prepared to find it an oozy swamp, fed by a moorland drainage of bogs and peat mosses.

A true poet is credited with seeing clearer and telling better than other people can, and in this case the credit is fairly earned by Sir Walter Scott, poet laureate of Scottish scenery. In the "Lay of the Last Minstrel" we read of "Fair St. Mary's silver Wave." In "Marmion,"

> Nor fen nor sedge
> Pollute the pure lake's crystal edge.
> Abrupt and sheer the mountains sink
> At once upon the level brink,
> And just a line of pebbly sand
> Marks where the water meets the land.

In plain prose your correspondent saw as follows:—St. Mary's Loch, a practically inexhaustible natural reservoir; in a district pastoral, not moorland. The surface of surrounding hills and flats, formed of loose rock, shingle, or gravel, with sprinkling of light earth, the very type of natural draining to prevent or exterminate bog, morass, and swamp. Not a trace of peat, except peat-reek odour from Tibbie Shiell's chimneys. Tibbie burns peats got from exceptional points high among the hills. The various feeders of the loch run in pure as water can be. That the loch, bedded in a shingly, gravelly flat, and surrounded with bare, smooth, lawn-like hill-slopes, should *appear* to contain brown-tinted water, arises from three concurrent causes. First, the extreme purity of the water; second, the tawny-brown hue of aquatic growths, enveloping the shingle under water, by transmission; third, the pipe-clay whiteness of the dry shingle on the beach, by contrast. From the first-stated cause the water varies in apparent tint according to the bottom hues. Aside from chemical analyses, the relative physical features at once decide St. Mary's Loch to excel the famous Loch Katrine as a water source.

The Edinburgh people are about to celebrate the centenary of Sir Walter Scott. His evidence, before cited, and the occasion, may serve to excuse the spontaneous testimony of

A STUDENT OF NATURE

Sun Spots and Earth Temperatures

I NOTICED lately the deduction by Mr. Stone of a connection between Wolf's solar spot periods and the earth temperatures at the Cape of Good Hope: and now Professor Smyth, at Edinburgh, recalls to our attention the fact that his own investigations had, a year ago, led him to a similar conclusion.

Will you permit me to call attention to a further discussion of this subject, as contained in a short article, published in Silliman's "American Journal of Science." The compilations were mostly made in February, 1869, and afford interesting confirmation of the results, which I suppose to have been deduced by Messrs. Smyth and Stone.

CLEVELAND ABBE,
Director Cincinnatti Observatory,
Washington, May 6 Meteorologist to the Signal Office

Bessemer Bombs

ALLOW me through the medium of your columns to call the attention of scientific men to the significant inference which, it appears to me, is to be drawn from the formation of "bombs" in the Bessemer process, incidentally described by Mr. Williams in a recent number of NATURE.*

These "bombs" are minute hollow spherules; the smaller are for the most part perforated. These minute hollow spherules are formed of liquid incandescent matter, the smaller showing the true form—perforated spheres.

The point to which I wish to direct the attention of Mr. Williams and other scientific men is this:—May we not have here an experiment which supplements those ingenious ones of M. Plateau on revolving liquid spheres? Mr. Williams will perhaps kindly examine some of the most perfect of these bombs, and let us know whether he sees trace of revolution in their formation. I believe he will find such evidence, and that the revolution is about the perforation.

C. E.

Brighton

THE STRASBOURG MUSEUM

A BRIEF notice of this Museum may not at this time be devoid of interest. It occupies ten large rooms in the Academy House of Strasbourg. Two rooms are devoted to Comparative Anatomy, and eight to the Zoological, Geological, and Mineralogical collections. One large hall is exclusively devoted to a collection of species indigenous to Alsace, and here its flora and fauna, both fossil and recent, will be found well represented. The large hall of Mammals contains about 2,000 specimens belonging to between 600 and 700 species, among which may be noticed a fine series of Felidæ, including two specimens of the rare *Felis pardina* of Portugal. Among the Ruminants are a grand specimen of the *Ovis nivicola* of Kamtschatka; four specimens of Tragelaphus from the mountains of Constantine, a large series in all stages of growth of the *Antilope rupicapra* from Switzerland, the Carpathians, and the Pyrenees; *Capra semlaica* of the Nilgherries; six specimens of *C. ægagrus* from Kurdistan, of which two are magnificent adult males and the others females and young; *C. walee* from Abyssinia, male and female; nine specimens of *C. hispanica* from the Sierra Nevada; seventeen of *C. ibex*, representing it in all its ages and in all states of wool; not to mention excellent specimens of *C. pyrenaica*, *C. caucasica*, *C. altaica*, and *C. sinaica*; indeed, it may be doubted if there is in any Museum a more complete collection of this interesting group. Of the Antelopes the Museum also possesses a grand series, and the attention in this corner of the hall will be at once attracted by the case of Reindeer, containing eight perfect specimens, representing the wild race of Norway, the domesticated animal of Lapland, and the varieties from Siberia, Greenland, and Labrador. There are also beautifully stuffed specimens of the European and American Bison, and among the Cervidæ we noticed a most interesting little variety from Corsica of *Cervus elaphas*.

Among the Rodents the Collection of Hares and Rabbits from all parts of the world is very fine. The Collection of Madagascar Lemurs is nearly complete. There are also fine specimens of *Colobus ursinus* and *C. vallerosus* from the Gaboon, and a skeleton of the female Gorilla; one of the largest specimens known of the Walrus, and an immense series of Phocidæ from the North Seas. We have omitted to mention two nice specimens of *Chlamydophorus truncatus*.

The Bird Galleries are very extensive, and contain upwards of 5,000 species and nearly 14,000 birds. The Collection of Vultures is very rich; *Gypœtus barbatus* from Switzerland, Pyrenees, Sierra Nevada, the Atlas, and Abyssinia; *Aquila pelagica* from Kamtschatka. Of Strix there are about 200 specimens and 60 species. The Birds of Paradise are represented by perfectly fresh specimens of *Semiophora Wallacei*, *Paradisea alba*, *Craspedophora magnifica*, male and female; *Astrapia nigra*, male and female; good specimens of both species of *Cephaloptera*; *Turacus giganteus*; *Anas Stelleri*, male and female; *Alca impennis*, a very old specimen. Passing by the grand series of Pelicans, of Grouse we record magnificent specimens of *Oreophatis derlyanus*, *Lophalector Macartneyi*, male and female, *Balœniceps rex*, &c.

The Reptiles and Fishes occupy two large halls.

The Entomological Collection is very fine; a portion of it is exposed to the public in one of the halls; but the greater part is kept in the Cabinet Room. Nothing can surpass the beauty and freshness of the collection of Alsace Insecta. The collection of Coleoptera numbers about 8,000 species.

The Palæontological Collection is arranged according to the geological formations; and one must remark a magnificent example of *Teleosaurus Chapmani*, 12 ft. long; a grand mass of *Pentacrinus fascicularis*, 5 ft. by 3, and containing 15 individuals established on a mass of oysters.

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* See NATURE, vol. iii. p. 410.

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The fossil plants are, as might be expected, very numerous, and many of them are well known through the memoirs, as well as the fine monograph on Fossil Plants, by Dr. Schimper.

In thus noticing some of the chief objects which attracted our attention during a visit to this Museum in January last, it is well also to remember that this grand collection owes its very existence to the life-long labours of Dr. Schimper. Since 1838 he has been the Director of the Museum, which before that time existed only in name. Throughout the terrible bombardment the Museum escaped almost without any damage, and has now become one of the most valuable prizes of war gained by the conquerors. The thanks of the world of science are due to the excellent director of this collection, for all that he has done for it and for science, and we hope we are not wrong in here expressing the wish that, should Prof. Schimper, having been all his life a Frenchman, find it impossible to change his nationality and so continue to reside in Strasbourg, that that new rule which knows so well when it likes how to appreciate the man of science, will not forget to whose care it is indebted for the magnificent prize which it has won.

E. P. W.

DUST AND SMOKE*

AFTER a few preliminary experiments illustrative of the polarisation of light, Prof. Tyndall adverted to the polarisation of light by fine dust, by the sky, and by the coarser particles of smoke. In the former the direction of maximum polarisation, as in the case of the sky, is at right angles to the illuminating beam. In the latter, according to the observations of Govi, the maximum quantity of polarised light was discharged obliquely to the beam. Govi's observation of a neutral point in such beam, on one side of which the polarisation was positive and on the other side negative, was also referred to. The additional fact was then adduced that the position of the neutral point varied with the density of the smoke. Beginning, for example, with an atmosphere thickened by the dense fumes of incense, resin, or gunpowder, and observing the neutral point, its direction was first observed to be inclined to the beam *towards* the source of illumination. Opening the windows so as to allow the smoke to escape gradually, the neutral point moved down the beam, passed the end of a normal drawn to the beam from the eye, and gradually moved forward several feet down the beam. The speaker did not halt at these observations, they were introduced as the starting point of inquiries of a different nature, and after their introduction the discourse proceeded thus :—

But what, you may ask, is the practical good of these curiosities? And if you so ask, my object is in some sense gained, for I intended to provoke this question. I confess that if we exclude the interest attached to the observation of new facts, and the enhancement of that interest through the knowledge that by-and-by the facts will become the exponents of laws, these curiosities are in themselves worth nothing. They will not enable us to add to our stock of food or drink or clothes or jewellery. But though thus shorn of all usefulness in themselves, they may, by leading the mind into places which it would not otherwise have entered, become the antecedents of practical consequences. In looking, for example, at this illuminated dust, we may ask ourselves what it is. How does it act, not upon a beam of light, but upon our own lungs and stomachs? The question at once assumes a practical character. We find on examination that this dust is organic matter—in part living, in part dead. There are among it particles of ground straw, torn rags, smoke, the pollen of flowers, the spores of fungi, and the germs of other things. But what have they to do with the animal economy? Let me give you an illustration to which my attention has been lately drawn by Mr. George Henry Lewes, who writes to me thus :—

"I wish to direct your attention to the experiments of von Recklingshausen should you happen not to know them. They are striking confirmations of what you say of dust and disease. Last spring, when I was at his laboratory in Würzburg I examined with him blood that had been three weeks, a month, and five weeks, out of the body, preserved in little porcelain cups under glass shades. This blood was living and growing. Not only were the Amœba-like movements of the white corpuscles present, but there were abundant evidences of the growth and development of the corpuscles. I also saw a frog's heart still pulsating which had been removed from the body (I forget how many days, but certainly more than a week). There were other examples of the same persistent vitality or absence of putrefaction. Von Recklingshausen did not attribute this to the absence of germs—germs were not mentioned by him; but when I asked him how he represented the thing to himself, he said the whole mystery of his operation consisted in keeping the blood *free from dirt*. The instruments employed were raised to a red heat just before use, the thread was silver thread and was similarly treated, and the porcelain cups, though not kept free from air, were kept free from currents. He said he often had failures, and these he attributed to particles of dust having escaped his precautions."

Prof. Lister, who has founded upon the removal or destruction of this "dirt" great and numerous improvements in surgery, tells us of the effect of its introduction into the blood of wounds. He informs us what would happen with the extracted blood should the dust get at it. The blood would putrefy and become fetid, and when you examine more closely what putrefaction means, you find the putrefying substance swarming with organic life, the germs of which have been derived from the air.

Another note which I received a day or two ago has a bearing particularly significant at the present time upon this question of dust and dirt, and the wisdom of avoiding them. The note is from Mr. Ellis, of Sloane Street, to whom I owe a debt of gratitude for advice given to me when sorely wounded in the Alps. "I do not know," writes Mr. Ellis, "whether you happened to see the letters, of which I enclose you a reprint, when they appeared in the *Times*. But I want to tell you this in reference to my method of vaccination as here described, because it has, as I think, a relation to the subject of the intake of organic particles from without into the body. Vaccination in the common way is done by scraping off the epidermis, and thrusting into the punctures made by the lancet the vaccine virus. By the method I use (and have used for more than twenty years) the epidermis is lifted by the effusion of serum from below, a result of the irritant cantharadine applied to the skin. The little bleb thus formed is pricked, a drop of fluid let out, and then a fine vaccine point is put into this spot, and after a minute of delay it is withdrawn. The epidermis falls back on the skin and quite excludes the air—and not the air only, but what the air contains.

"Now mark the result—out of hundreds of cases of re-vaccination which I have performed, I have never had a single case of bloodpoisoning or of abscess. By the ordinary way the occurrence of secondary abscess is by no means uncommon, and that of pyæmia is occasionally observed. I attribute the comparative safety of my method entirely, first, to the exclusion of the air and what it contains; and, secondly, to the greater size of the apertures for the inlet of mischief made by the lancet."

I bring these facts forward that they may be sifted and challenged if they be not correct. If they are correct it is needless to dwell upon their importance, nor is it necessary to say that if Mr. Ellis had resigned himself wholly

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* Lecture delivered at the Royal Institution, Friday evening, June 9, 1871.

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